

TW06 Tests High-Tech Gear

By Robert J. Leone

The contributions today's technologies offer the U.S. military often require extensive tests and much research to validate their employment throughout the fleet. In mid-June, the Navy put some new technology to the test in its annual Sea Trial event, Trident Warrior '06, executed just off the West Coast near San Diego. A unique driving force added to this year's Trident Warrior was the additional emphasis placed on communications between the Navy and Department of Homeland Security, more specifically the federal, state and local authorities in San Diego County's Emergency Operations Center.

However, TW06's major goal was to generate enough data from various technologies to accurately measure whether these new systems and methods really work. Some of the featured network-centric technology included Predator B, an unmanned aerial vehicle that collected video data for homeland security, as well as targeting information for a live-fire exercise against a simulated terrorist target. A simulator for a Littoral Combat Ship was also one of the new "headliners" this year, but it was a tiny, silver-dollar-sized piece of miniaturized electronics that captured a new audience.

The use of microscopic waves of infrared light is relatively old technology that has fantastic capability, according to communications experts. The idea that the same light used to operate television, compact disc and DVD players via remote control could be used for Navy shipboard communications gained more skepticism than belief — until a company recently developed a tiny light emitting diode (LED) transmitter and receiver system utilizing prisms.

The LED device can be placed over the eyepieces (lens) of optical devices, such as gun scopes or binoculars, to exchange voice and digital data. Many now view this technology as something that may reduce the U.S. military's dependency on radio frequency communications. The Navy could use the transmitter on regular binoculars to allow a user to verbally communicate with another user using the same technology by plugging an earpiece into an attachment on the binoculars, much like a user would plug in a hands-free set into a cell phone.

This option could allow an operator along the coastline to communicate "silently" with a ship several miles offshore, or with the installation of the transmitter on a larger set of ship-mounted binoculars, ship-to-ship communications would be possible. A laptop connected to the binoculars would allow users to share data such as maps and charts or streaming video.

Communication from a naval platform is bandwidth limited and radio frequencies are vulnerable to jamming. Further, using radio frequency communications requires booking satellite time and frequencies — in advance — not to mention the possibilities of a radio transmission being intercepted. The need for non-radio technology became evident during military operations in the war on terrorism especially with the limitations of radio communications. Exchanging data via infrared light can be ac-



Photos above and at right: The NovaSol laser system, which was tested during Trident Warrior 2006 aboard the USS Bonhomme Richard (LHD 6). The laser system uses light frequencies — an advantage over radio frequency transmission.



complished as far apart as 12 nautical miles via line-of-sight laser beam — and it can extend even further by reflecting the light off a window or another reflective object.

Light frequencies are not regulated, cannot be easily detected and are virtually impossible to intercept. The Naval Research Laboratory brought a laser system developed by a Hawaii-based company, NovaSol to TW06. This year's testing used a gimballed laser that could transmit uncompressed live-video of the movie "Top Gun" along with separate voice communication feeds from the USS Bonhomme Richard (LHD 6) to another ship.

The ships simultaneously beamed an uncompressed movie back to the Richard. Both tests were successful. Researchers, as well as the Navy, are anxious to see this laser system integrated into a ship's navigation system for automatic location locking and being part of a ship's router when within line of sight of other platforms with a laser capability.

This demonstration was a big win for TW 06.

Robert Leone is an engineer and the networks lead for Trident Warrior 2006.

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